H. G. SCHWERDTLE.

APPARATUS FOR REGISTERING AND FEEDING SHEETS.

APPLICATION FILED JUNE 24, 1915.

1,201,360.

Patented Oct. 17, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

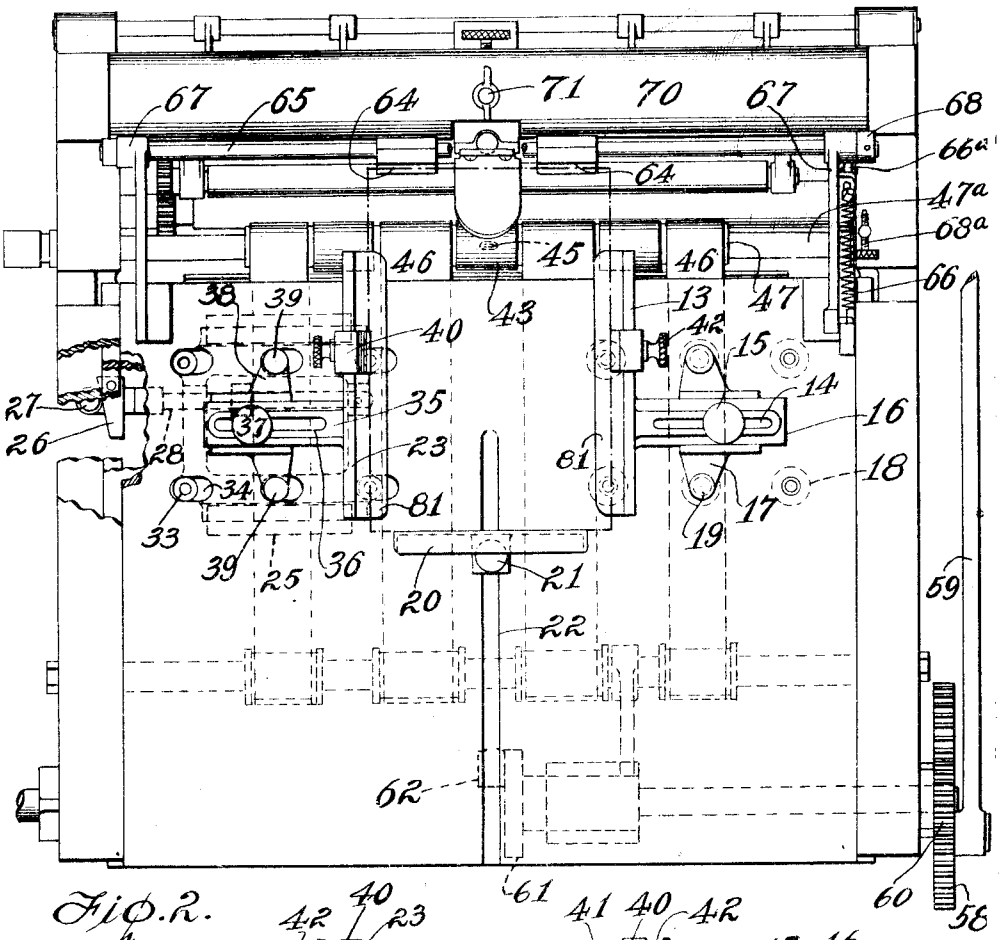
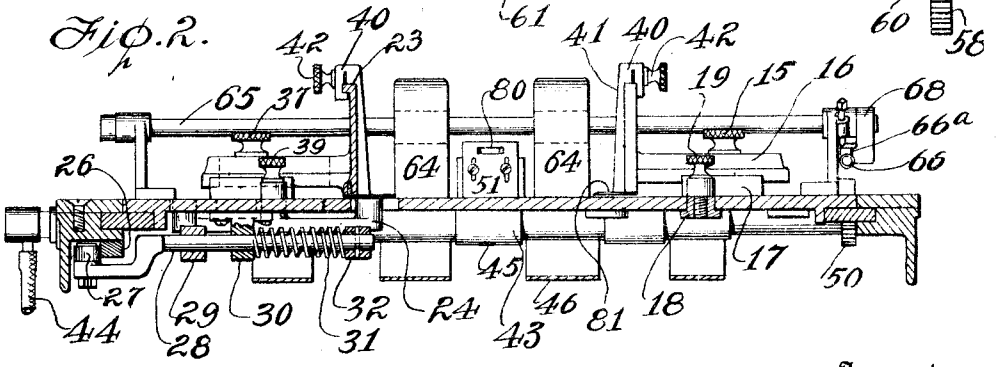


Fig. 2.



Witnesses:

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2 SHEETS—SHEET 2.

Fig. 3.

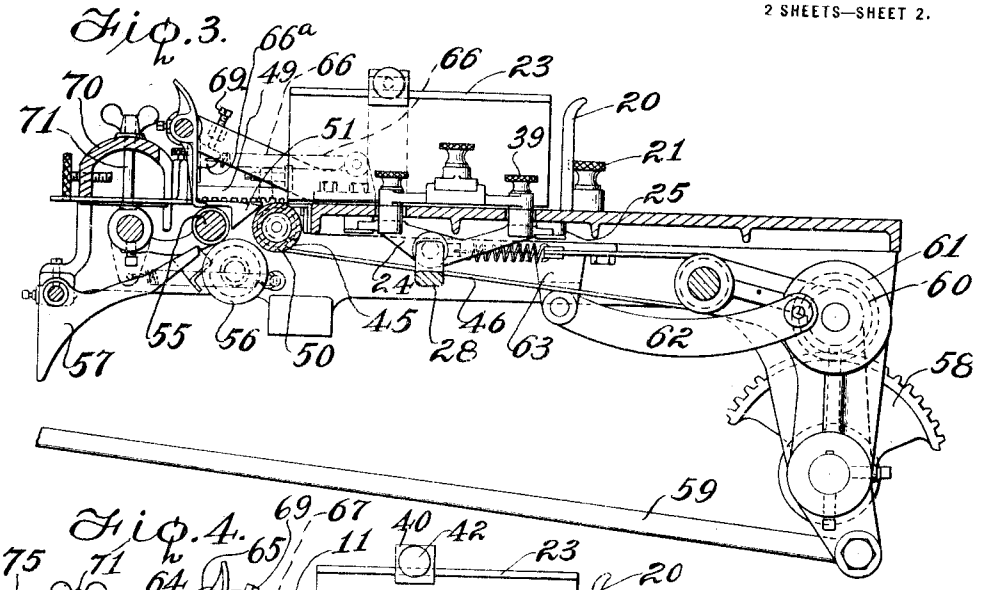


Fig. 4.

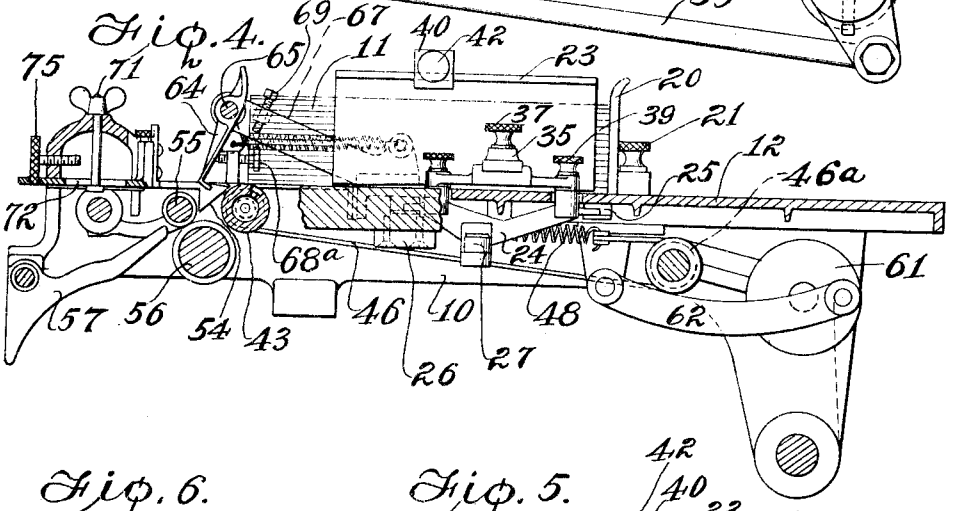


Fig. 6.

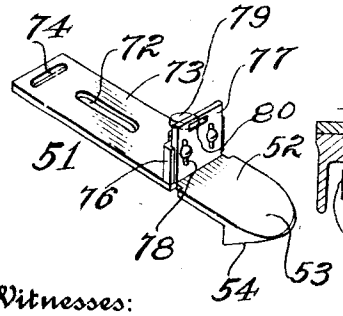
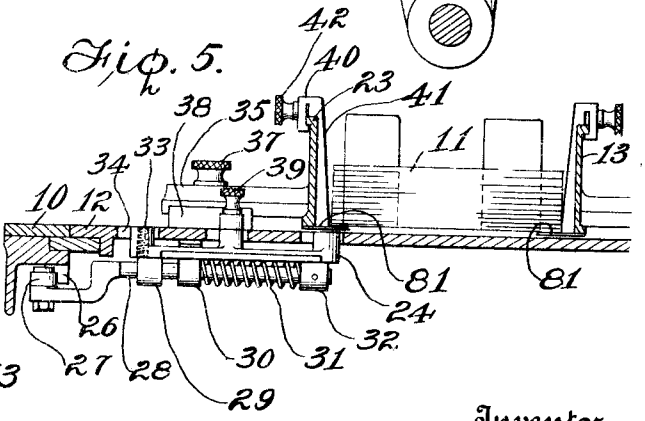


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY G. SCHWERDTLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO STOKES & SMITH COMPANY, OF SUMMERDALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR REGISTERING AND FEEDING SHEETS.

1,201,360. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed June 24, 1915. Serial No. 36,020.

To all whom it may concern:

Be it known that I, HENRY G. SCHWERDTLE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Registering and Feeding Sheets, of which the following is a specification.

This invention relates to a single sheet registering, separating and feeding mechanism and while the mechanism may be used for feeding sheets singly from a pack for any purpose whatever, the mechanism is expected to be used largely for feeding sheets into a printing press.

A principal object of the invention is to provide improved means for insuring a substantially perfect register of the sheet before it is separated from the pack, and fed forward.

A further object of the invention is to improve the construction of parts of the separating device to facilitate their accurate adjustment with relation to each other.

Further objects of the invention will appear more clearly hereinafter.

The invention consists in the features and general combination of parts, all of which contribute to produce an efficient registering, separating and feeding mechanism.

A preferred embodiment of the invention is described in the following specification while the broad scope of the invention is pointed out in the appended claims.

In the drawing, Figure 1 is a plan of a machine embodying the invention. Certain parts of this view are broken away to more clearly illustrate the machine. Fig. 2 is a vertical cross-section through the machine shown in Fig. 1. Fig. 3 is a longitudinal vertical section through the machine showing the mechanism in one of the positions it may assume. Fig. 4 is a view similar to Fig. 3 but showing the mechanism in another position. Fig. 5 is a vertical transverse section further illustrating details of the construction. Fig. 6 is a perspective of a picker finger which constitutes a feature of the invention.

Before proceeding to a description of the invention, it should be stated that according to this invention, a plurality of sheets are preferably supported in a pack, and means is provided for successively separating the foremost sheet, in the present embodiment the bottom sheet from the pack and for automatically registering this sheet before it is removed. This is preferably accomplished by employing means to shift the bottom sheet of the pack laterally, but at the same time the mechanism may operate to effect a more and more perfect register of the sheets as they move through the pack toward the foremost face of the pack, that is, the point from which they leave the pack, at which point the sheets are separated or removed one by one from the pack. This lateral registering movement may be effected in any manner desired. The separating means may be of any desired nature. I prefer, however, to support the pack and reciprocate the support, and in one of the reciprocating movements effect the separation of the foremost or bottom sheet of the pack. In order to accomplish these purposes, the mechanism comprises a frame 10 which may be provided with a horizontally reciprocating table 12 adapted to support a pack 11 of sheets.

In the present embodiment of the invention, this table is preferably provided on one side of its central line with a relatively fixed guide means or gage 13 which is preferably adjustable by means of a slot 14, and a clamping bolt 15 which is mounted in a horizontal foot 16, and this foot is guided adjustably in a base 17. This base 17 may be supported in any one of a plurality of different positions by suitable means such as threaded sockets 18 mounted in the table which receive a pair of removable thumb screws 19 carried by the base. The transverse edge of the pack of sheets is alined by means of another relatively fixed alining means or gage 20 which may be secured in any desired position by means of an adjustable clamp 21 mounted in a longitudinal slot 22 formed in the table. Cooperating with the relatively fixed guiding or register means 13, a movable alining means or side register gage 23 is provided to force the bottom sheet over against the alining means or fixed side register gage 13. This movable side register means may be of any desired nature or construction. In the present embodiment it is in the form of a movable gage or plate 23 which is mounted above the table and operated so as to move laterally with respect to the direction of feed inwardly

and outwardly on the table. In order to effect this movement, the alining means 23 is preferably supported on a reciprocating carriage 24, mounted in any suitable manner so that it may reciprocate. For this purpose, if desired, the side edges of the carriage may be supported and guided by suitable side cleats 25 (see Figs. 1 and 3). The carriage 24 is preferably in the form of an open frame. Any suitable means is provided for reciprocating this frame. However, this is preferably accomplished automatically and partially through the medium of a spring.

In the present embodiment the reciprocation of the table automatically effects the lateral reciprocation or movement of the alining means 23. For this purpose, the frame 10 is preferably provided with a fixed cam 26, the outer edge of which engages a roller 27 upon each rearward reciprocation of the table, and this roller is supported on the outer end of a stem 28 which is secured to the under side of the frame in suitable lugs 29 and 32. This stem passes through a guide lug 30 on the under side of the table, and a spring 31 is provided, thrusting against this lug disposed around the inner portion of the stem and exerting its force against the inner lug 32 on the frame. With this arrangement evidently at each rearward reciprocation of the table the cam will pull the frame 24 outwardly. The cam 26 is short so that the roller 27 eventually passes beyond the cam and this releases the spring 31 which then suddenly moves the carriage inwardly.

In order to enable the guide means 23 to be attached to the carriage in a plurality of different positions, a similar arrangement is adopted to that already described on the other side of the table. In other words, three or more threaded sockets 33 are provided on the upper side of the carriage 24 and these sockets are preferably formed in bosses which lie in slots 34 in the table. These slots, of course, permit the reciprocation of the carriage. The movable guide means 23 is preferably substantially similar to the fixed guide means 13 which is at the right in Fig. 1, that is, it comprises a foot 35 having an adjusting slot 36 and a coöperating clamping bolt 37 which adjustably secures the alining means in a base or seat 38. This seat 38 is provided with a pair of removable screw bolts 39 which may be received in any pair of the threaded sockets 33. The two alining members or registering gages 13 and 23 are preferably provided with sheet guides 40 which preferably have inner faces 41 slightly inclined from the vertical for contacting with the side edges of the pack. These guides in the present embodiment are narrow so as to engage the side edges of the sheets near their middle point, and give the effect of abutments or posts at the inner faces of plates 13 and 23. They may be slid along to any position desired and clamped there by means of clamping bolts or thumb heads 42.

Any suitable means may be provided for removing the foremost or bottom sheet of the pack. This is preferably accomplished as the table moves rearwardly. For this purpose there is preferably provided a rotary suction picker 43 which is of tubular form and provided with a pneumatic connection 44 (see Fig. 2). The wall of this roller is provided with a suction opening 45 and the upper face of this suction roller is about on a level with the upper face of the table so that as the table reciprocates rearwardly, the projecting edge of the pack contacts with the roller. In this connection it is understood that the pack 11 projects at its rear edge beyond the edge of the table and the overhanging portion of the pack is supported in the present embodiment by means of flexible bands 46 which pass around suitable guide rollers 47 on the shaft 47^a of the picker roller. These bands 46 pass downwardly and around the fixed guide rollers 46^a and at their inner ends are attached to springs 48 or other means for maintaining the bands under suitable tension. The other ends of the bands are attached to the forward edge of the table.

Any suitable means is provided for rotating the picker roller and holding it in the proper relation to the pack as the table reciprocates. In the present instance, the roller shaft is rotated by means of a horizontal rack 49 attached to the table (see Fig. 3) meshing with a pinion 50 on the shaft 47. As the table moves rearwardly, the bottom sheet of the pack comes in contact with the suction opening 45 and hence when the partial vacuum is developed in the roller, the forward edge of the bottom sheet adheres to the roller and wraps itself upon the roller as the roller rotates. In order to coöperate with the picker roller to separate the sheet from the pack, there is preferably provided a picker finger 51. This finger has a substantially flat upper face 52 which is preferably substantially in the plane of the upper face of the table. The nose 53 of the picker is rounded, as viewed in plan, but is preferably slightly depressed toward its point on its upper face, as viewed in side elevation; and furthermore, it is preferably provided with an inclined lower and forward face 54. This picker finger is adjustably mounted so that its point or nose lies very near the face of the roller, and in such a way that when the sheet being fed comes along on the face of the roller, its forward edge passes down between the guide face 54 and the roller. Shortly after this the vacuum is released and the guide face 54 of the picker finger then guides the sheet forward

into any kind of a feeding device such as the feed rollers 55 and 56 which may be rotated by any suitable means (not illustrated); the rollers pass the sheet on down against a guide 57 which may guide the sheet into a press or into any other mechanism.

The table 12 may be reciprocated in any suitable manner as, for instance, by means of a rocking segment 58 which may be rocked back and forth automatically from any moving part of the machine by means of a link 59. This segment may mesh with a pinion 60 having a disk crank 61 which is connected by a link 62 with a lug 63 on the under side of the table. When the table 12 starts its return or forward movement after having approached the picker finger 51, there is a tendency in the pack 11 to move onwardly by reason of its momentum. In order to keep the pack intact, there is preferably provided a keeper in the form of two or more downwardly extending arms 64. These arms are preferably mounted on a transverse shaft 65 and are constantly pulled toward the pack by a spring 66 connected with an abutment 66^a on the shaft. This shaft 65 is preferably supported in suitable bracket arms 67 on the table, and when the table returns and moves away from the picker, the arms 64 are held back through the agency of an adjustable stop or screw 68^a which engages and coöperates with a short arm 68 on the shaft. When the table is in its extreme rearmost position, the arms 64 swing downwardly to about a vertical position in which they are stopped by means of an adjustable stop or screw 69 (see Fig. 3) which engages the aforesaid abutment 66^a. The picker finger is preferably mounted so that it is independently adjustable in two directions. This is preferably accomplished by providing a member that is adjustably movable toward the picker roller and providing this member with guiding means and independent adjusting means for the picker point. The picker finger 53 is preferably supported by a cross-head or bolster 70 at the rear of the frame, and near its middle point this bolster is provided with a bolt 71 which is received in a slot 72 formed in the main plate or body 73 of the picker finger. Means is provided for giving this plate 73 a forward adjustment which is permitted by the slot 72 when the bolt 71 is loosened. In order to accomplish this the plate 73 is provided with a transverse slot 74 which receives the lower edge of a horizontal adjusting screw 75 mounted in the outer wall of the bolster or cross-head 70. By rotating this screw 75 evidently the finger can be adjusted bodily toward the roller and a very nice adjustment of the nose 53 of the finger can be effected.

According to the present invention, the picker finger is made bodily adjustable independently in another direction, preferably vertically; and this is preferably accomplished by adjusting the nose 53 of the picker finger 73. In order to effect this, in the present embodiment, the forward end of the plate 73 is provided with an upwardly extending guide 76. This guide receives a rearwardly and upwardly turned extension 77 which is formed at the rear end of the nose 52, and this extension 77 is provided with pin and slot connections 78 with the guide 76. Furthermore, the guide 76 is preferably provided with a vertical adjusting screw 79, the edge of which is received in a substantially horizontal slot 80 in the extension 77. Evidently by rotating this screw 79, the nose 52 may be nicely adjusted up or down.

The lower edges of the alining members 13 and 23 are preferably provided with means for supporting the pack at its side edges and this means is preferably in the form of thin plates or blades 81 which project inwardly under the pack and lie very near the upper face of the table. These plates are preferably rigidly secured to the alining devices and form ledges for supporting the side edges of the pack. They prevent the bottom sheet of the pack from going under the lower edges of the gages 13 and 23.

The mode of operation of the devices described is substantially as follows: The pack of sheets to be fed is placed in the space between the registering or alining devices 13, 23 and 20. The table 12 reciprocates in a front and rear direction so as to coöperate with the separating mechanism including the picker roller 43 which separates the bottom sheet of the pack at each rearward reciprocation of the table. With each reciprocation of the table, the pack on the table is shifted laterally which tends to aline it and finally effects the proper registration of each sheet as it arrives at the table and becomes the bottom sheet. At regular intervals the registered sheet is separated and fed forward from the pack. Referring to Fig. 5, it will be evident that as the pack of sheets is moved or jostled laterally by the movable alining device, the sheets in the pack are gradually descending and as they descend they are guided on their side edges by the slightly inclined faces 41 of the guides 40. In this connection it should be understood that the two alining members are placed so that when the movable alining member 23 is at the limit of its inward movement, the distance between the faces 41 at the plates 81 is exactly the width of the sheets of the pack. In one aspect the operation of alining or registering the sheets of the pack may be considered as consisting in constantly crowding or jostling the sheets over against the fixed

and inclined alining edge so that as the sheets progress or descend along this edge, they are gradually brought successively by it into accurate register. The efficient registering effect resulting from the operation of this mechanism may be due partially to the fact that at each reciprocation of the table the sheets of the pack are slightly loosened. This is due to the inertia of the sheets when their direction of movement reverses with the reversal of the direction of movement of the table. It will be evident that while in this loosened or mobile state the sheets are readily guided by a pressure upon a lateral edge into the desired alining or registering position.

It is understood that the embodiment of the invention set forth herein is only one of the many embodiments or forms the invention may take, and I do not wish to be limited in the practice of the invention nor in my claims to the particular embodiment set forth, and I may use any feature of my mechanism or method without the other features.

What I claim is:

1. In a machine for registering, separating and feeding single sheets from a pack, a table for supporting the pack mounted to reciprocate, means for reciprocating the table, means for successively removing the sheets one by one from the foremost face of the pack, and automatic means for side registering each sheet of the pack before it is removed.

2. In a machine for registering, separating and feeding single sheets from a pack, a table mounted to reciprocate, relatively fixed alining means on the table, means for moving the bottom sheet of the pack to effect side register of the same with said relatively fixed alining means, and means for successively removing the bottom sheet of the pack.

3. In a machine for registering, separating and feeding single sheets from a pack, a table mounted to reciprocate, relatively fixed alining means on the table, means for reciprocating the table, means for successively removing the sheets one by one from the bottom of the pack, whereby the sheets in the pack descend through the pack to the table, and movable means operating automatically to move the sheets laterally with respect to the direction of feed to effect side register of the sheets as they descend through the pack.

4. In a machine for registering, separating and feeding single sheets from a pack, in combination, a support for the pack of sheets, side registering means for periodically tending to shift the pack bodily laterally with respect to the feeding direction, and separating means operating to remove the bottom sheet of the pack.

5. In a machine for registering, separating and feeding single sheets from a pack, in combination, a support for the pack of sheets, means for reciprocating said support in a front and rear direction, side registering means for periodically shifting the pack bodily laterally with respect to the direction of feed, and separating means operating during the rearward movement of said support to remove the bottom sheet of the pack.

6. In a machine for registering, separating and feeding single sheets from a pack, in combination, a feed table mounted to reciprocate, means for alining a pack of sheets on the table and for periodically shifting the pack bodily laterally with respect to the feeding direction, and means for removing the bottom sheet of the pack as the table reciprocates rearwardly.

7. In a machine for registering, separating and feeding single sheets from a pack, in combination, a table mounted to reciprocate, means for alining a pack of sheets on said table with the edge of the pack projecting beyond the rear edge of the table, means tending to shift the pack bodily laterally on the table with respect to the feeding direction, and means for removing the bottom sheet from the pack as the table reciprocates rearwardly.

8. In a machine for registering, separating and feeding single sheets from a pack, in combination, a feed table mounted to reciprocate, a member adjacent to said table and movable laterally on the table with respect to the feeding direction to effect side register of the pack, automatic means for moving said movable member laterally at the table with respect to the feeding direction, and means operating to remove and feed forward the bottom sheet of the pack.

9. In a machine for registering, separating and feeding single sheets from a pack, in combination, a feed table mounted to reciprocate, a member adjacent to said table with respect to the feeding direction and movable laterally on the table to cause a lateral shifting side registering movement of the pack, means on the table for withdrawing said movable member outwardly, a spring for moving the said movable member inwardly to aline the pack, and means operating to remove and feed forward the bottom sheet of the pack.

10. In a machine for registering, separating and feeding single sheets from a pack, a table mounted to reciprocate, relatively fixed side registering means on the table, laterally movable side registering means on the table coöperating with said fixed alining means to hold a pack therebetween, automatic means for slightly withdrawing said movable side registering means as the table reciprocates, a spring for returning said

movable side registering means to shift the pack toward the fixed side registering means, and means operating to remove the bottom sheet of the pack as the table reciprocates rearwardly.

11. In a machine for registering, separating and feeding single sheets from a pack, in combination, a table mounted to reciprocate, relatively fixed adjustable alining means on the table for alining one side of the pack, a carriage supported on the table and movable laterally with respect thereto, alining means supported on said carriage opposite said first named alining means, means for automatically operating said movable alining means to engage the edge of the pack and shift the same bodily laterally, and means for removing the bottom sheet of the pack as the table reciprocates rearwardly.

12. In a machine for registering, separating and feeding single sheets from a pack, in combination, a support for the pack, a relatively fixed side registering device adjacent said support and having an inclined guide face extending upwardly from said support, movable side registering means on the opposite side of the pack having an inclined face to engage the edge of the pack for shifting the pack laterally with respect to the feeding direction toward said first named inclined guide face, and means for removing the bottom sheet from the pack.

13. In a machine for registering, separating and feeding single sheets from a pack, in combination, a support for the pack, a relatively fixed alining device adjacent said support and having an inclined guide face extending upwardly from said support, movable alining means on the opposite side of the pack for shifting the pack laterally toward said inclined guide face, and means for removing the bottom sheet from the pack.

14. In a machine for registering, separating and feeding single sheets from a pack, a table mounted to reciprocate, relatively fixed alining means on the table, laterally movable alining means on the table coöperating with said fixed alining means to hold the pack therebetween and operating to move the bottom sheet of the pack laterally against the fixed alining means, said alining means having means projecting under the edge of the pack, and means for removing the bottom sheet of the pack.

15. In a machine for registering, separating and feeding single sheets from a pack, a table mounted to reciprocate, relatively fixed alining means on the table having a guide face disposed toward the pack and slightly inclined from a vertical line, laterally movable alining means on the table cooperating with said fixed alining means to hold the pack therebetween and operating to shift the pack bodily laterally toward the said fixed alining means, automatic means for moving said laterally movable alining means, said alining means having edges projecting inwardly therefrom to support the edges of the pack, means for reciprocating the table, and means for removing the bottom sheet from the pack.

16. In a sheet feeding mechanism, the combination of a feed table for carrying the sheet to be fed, a picker roller for engaging the forward edge of the sheet, a picker finger consisting of a supporting body, and a nose coöperating with the roller to effect the removal of the sheet, means for adjusting said supporting body toward said roller and means for guiding and adjusting said picker nose on said supporting body to slide toward said roller.

17. In a sheet feeding mechanism, the combination of a substantially horizontal feeding table for supporting a sheet to be fed, a picker roller for engaging the forward edge of the sheet, a picker finger coöperating with the roller to effect the removal of a sheet, comprising a supporting body and a nose movably mounted upon said supporting body, means for bodily adjusting said supporting body in a substantially horizontal direction toward said picker roller and means for independently adjusting and guiding said picker nose to slide bodily toward said roller in a substantially vertical direction.

18. In a sheet feeding mechanism, the combination of a reciprocating feed table for supporting a pack of sheets to be fed, a picker roller for engaging the forward edge of the bottom sheet of the pack, a picker finger comprising a supporting body and a nose mounted to slide on said supporting body, said nose having a substantially flat upper face substantially in the plane of the upper face of said table and coöperating with said picker roller to remove the bottom sheet of the pack, means for adjusting said supporting body in a substantially horizontal direction toward said roller, and means for adjusting said nose on said supporting body in a substantially vertical direction.

19. In a sheet feeding mechanism, the combination of a reciprocating feed table for supporting a pack of sheets to be fed, a picker roller for engaging the forward edge of the bottom sheet of the pack, a picker finger comprising a supporting body and a nose mounted to slide on said supporting body, said nose having a substantially flat upper face substantially in the plane of the upper face of said table and coöperating with said picker roller to remove the bottom sheet of the pack, means for adjusting said supporting body in a substantially horizontal direction toward said roller, and means for adjusting said nose on said supporting body in a substantially vertical direction, said nose slightly depressed on its upper

face at its point adjacent to the picker roller and having an inclined forward and lower face lying adjacent to the face of the roller.

20. In a machine for registering, separating and feeding single sheets from a pack, in combination, a table for supporting the pack mounted to reciprocate, means for reciprocating said table at a relatively high velocity whereby the upper sheets of the pack tend to move forward and back by their own inertia at each reversal of movement of the table, relatively fixed alining means on the table, and movable means operating automatically tending to guide the sheets of the pack laterally with respect to the feeding direction toward said fixed guiding means.

21. In a sheet feeding mechanism, in combination, a feed table for supporting the sheets to be fed, a picker roller for engaging the forward edge of the sheet, a member adjustable toward said picker roller, a picker finger, means for guiding said picker finger on said member, and means for adjusting said picker finger on said member.

22. A picker finger for use in a sheet feeding mechanism, comprising a supporting body having means for supporting the same on the frame of the feeding mechanism, said supporting body consisting of a plate with a laterally disposed guide, a picker nose having an extension mounted to slide on said guide and having means for clamping the same to said guide.

23. A picker finger for use in a sheet feeding mechanism, comprising a supporting body having means for supporting the same on the frame of the feeding mechanism, said supporting body consisting of a plate with a laterally disposed guide, a picker nose having an extension mounted to slide in said guide and having means for clamping the same to said guide, in combination with means for adjusting said supporting body with respect to the frame of the feeding mechanism and means for adjusting said picker nose in said guide.

24. In a machine for registering, separating and feeding single sheets from a pack, in combination, a support for the pack of sheets, relatively fixed alining means adjacent said support, relatively movable alining means tending to move the pack laterally on the table toward said fixed alining means, a back alining means for engaging the outer edge of the pack operating to aline the transverse outer edge of the pack, and means for successively removing the bottom sheet from the pack.

25. In a machine for registering, separating and feeding single sheets from a pack, in combination, a table for supporting the pack of sheets, means for reciprocating the table, means for separating the sheets one by one from the bottom of the pack, movable means carried by the table for registering the bottom sheet of the pack before it is removed, and means for maintaining a driving connection to said last named means to operate the same while the table is reciprocating.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY G. SCHWERDTLE.

Witnesses:

ROBT. H. BROWN,

ERNEST G. RIDER.